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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/986,302	11/08/2001	Toshihiko Tsuji	684,3282	5184

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EXAMINER

FULLER, RODNEY EVAN

ART UNIT PAPER NUMBER

2851

DATE MAILED: 07/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/986,302

Applicant(s)

TSUJI ET AL.

Examiner

Rodney E Fuller

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) ☐ Other: ____

DETAILED ACTION

Specification

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

2. The abstract of the disclosure is objected to because of the following items:
 - a. The phrase "Disclosed is a scanning exposure apparatus..." can be implied.
 - b. The word "patter" in line 4 appears to be a typographical error.
 - c. The abstract exceeds the 150-words limit.

Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-6 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakashima, et al. (US 5,534,970).

Regarding claim 1, Nakashima discloses “an illumination optical system for defining an illumination region, having a slit-like section (Fig. 1, ref.# 15; column 3, line 13), on an original (Fig. 1, ref.# R) with use of laser light (column 1, line 14); and driving means for relatively scanningly moving an original (Fig. 1, ref.# SR) and a substrate (Fig. 1, ref.# SW) relative to the illumination region; wherein said illumination optical system (Fig. 1, ref.# 8-10) includes a scanning optical system for scanning a pupil plane of said illumination system with the laser light to produce a secondary light source (Fig. 1, ref.# LS; column 12, lines 53-56) thereon, such that the illumination region is defined by light from the secondary light source; and wherein, when the width of the illumination region is W (mm), the scan speed of the original and/or the substrate is V (mm/sec., and the time necessary for defining the secondary light source once is T (sec), a relation $W/V = nt$ is satisfied, where n is an integer.” (Note: The claimed relationship between the width of the illumination region (W), the scan speed (V) and the time necessary for defining the secondary light source is inherent.)

Regarding claim 2, Nakashima discloses “an excimer laser (column 1, line 14) for supplying the laser light, and a projection optical system for projecting a pattern of the original onto the substrate.”

Regarding claim 3, Nakashima discloses a “wavelength maintaining means (Fig. 2, ref.# 21-29) for maintaining the wavelength of laser light from said excimer laser constant, wherein said excimer laser is a continuous (column 19, line 6) emission type excimer laser, and wherein said projection optical system (Fig. 1, ref.# PL) is provided by a lens system being made of a substantially single glass material.”

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Regarding claim 4, Nakashima discloses “wherein said wavelength maintaining means includes detecting means (Fig. 2, ref.# 31) for detecting the wavelength of laser light from said excimer laser, and resonator length changing means (Fig. 2, ref.# 23) for changing the resonator length of said excimer laser in accordance with an output of said detecting means.”

Regarding claim 5, Nakashima discloses “wherein said apparatus is adapted for formation of an image of a linewidth 0.13 micron, and wherein a half bandwidth of a wavelength spectrum of the laser light is not greater than 0.1 pm.” (Column 1, line 14 teaches the use of an ArF excimer laser. An ArF laser will inherently have a half bandwidth of a wavelength spectrum which is not greater than 0.1 pm, and would allow an image of a linewidth of 0.13 microns to be resolved.

Regarding claim 6, Nakashima discloses “wherein said apparatus is adapted for formation of an image of a linewidth 0.09 micron, and wherein a half bandwidth of a wavelength spectrum of the laser light is not greater than 0.08 pm.” (Column 1, lines 14-15 teaches the use of a KrF or ArF excimer laser, YAG laser, or the like. A F2 laser is a well known alternative to a KrF laser as an art recognized alternative. This substitution would inherently include a laser wherein a half bandwidth of a wavelength spectrum of the laser light is not greater than 0.08 pm, and would allow an image of a linewidth of 0.09 microns to be resolved.

Regarding claim 10, Nakashima discloses “exposing a substrate with a pattern by use of a scanning exposure apparatus as recited in Claim 1; and developing the exposed substrate.” (column 1, lines 18).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakashima, et al. (US 5,534,970) in view of Tezuka, et al. (US 5,170,207)

Nakashima discloses all the structure set forth in the claims except wherein (claim 7) “wherein the glass material is SiO₂,” and (claim 8) “wherein the glass material is CaF₂, BaF₂ or MgF₂.” It would have been obvious to one having ordinary skill in the art at the time the invention was made to select the glass material from SiO₂, CaF₂, BaF₂ and MgF₂, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

7. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakashima, et al. (US 5,534,970) in view of Tezuka, et al. (US 5,170,207)

Nakashima discloses all the structure set forth in the claims except “wherein said lens system includes lens elements of a number of at least ten, and wherein first one or first two of said lens elements in an order from the substrate side are made of CaF₂, BaF₂ or MgF₂.” Tezuka shows in Figure 3 a projection system that includes a lens system made up of more than ten lens

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elements. The system of Tezuka is designed to optimize exposures during lithographic processes made with short wavelength lasers (see abstract). Further, it is disclosed that the lenses of the system of Tezuka should be made with SiO₂ or CaF₂ (column 1, lines 40-44). In view of the teachings of Tezuka, it would have been obvious to include the projection optical system of Tezuka in the apparatus of Nakashima in place of the projection lens in order to optimize the exposures performed with short wavelength lasers.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Hikima (US 4,952,945), Ichihara (US 4,851,978), Ichihara (US 5,307,207), Ichihara, et al. (US 5,253,110) each disclose a scanning exposure system with an illumination optical system for defining an illumination region on an original with the use of laser light.

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9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney E Fuller whose telephone number is 703-306-5641. The examiner can normally be reached on 8:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Russ Adams can be reached on 703-308-1436. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1782.

Rodney Fuller
Primary Examiner

A handwritten signature in black ink, appearing to read 'Rodney Fuller', is written over the printed name and title.

July 17, 2003